DOCUMENT RESUME

ED 032 783 24 EM 007 459

By-Banister, Richard E.

Comparison of Two History Instruction Methods: Radio Broadcasting and Visual Aids Versus Individualized Instruction with Audio-Visual Aids. Final Report.

Mount San Jacinto Coll., Gilman Hot Springs, Calif.
Spons Agency-Office of Education (DHEW), Washington, D.C. Bureau of Research.
Bureau No-BR-8-I-137
Pub Date Jul 69
Grant-OEG-9-9-140137-0007-057
Note-16p.
EDRS Price MF-$0.25 HC-$0.90
Descriptors-American History, *Audiovisual Instruction, Community Colleges, *Community Education, Curriculum Development, *Educational Radio, Filmstrips, *History Instruction, Instructional Design, Instructional Materials, Junior Colleges, *Multimedia Instruction, Programed Instruction, Radio, Tape Recordings, Teaching Methods

Two American history courses taught by different multimedia methods were compared. Each course was semi-automated in order to free the instructor's time for question and answer periods. One experimental group of junior college students took the course using FM radio, an illustrated syllabus, and student response sheets. Another group took the same subject on campus using a combination of tapes, filmstrips, student response sheets, and seminars. The radio students were able to conduct a discussion with their instructor by calling the radio station each night that the program was presented. A t-test was run to compare the mean scores of these two groups on two mid-term tests and one final test. A statistical analysis of the data determined that there was no significant difference at the 1% level of confidence in the learning of the two groups. It was felt that the course could be successfully taught by radio and thus fulfill the college's responsiblity for community education. (Author/JY)

ED032783

FINAL REPORT
Project No. 8-I-137
Grant No. OEG-9-9-140137-0007(057)

COMPARISON OF TWO HISTORY INSTRUCTION METHODS: RADIO BROADCASTING AND VISUAL AIDS VERSUS INDIVIDUALIZED INSTRUCTION WITH AUDIO-VISUAL AIDS

Richard E. Banister
Mt. San Jacinto College
P. O. Box 248
Gilman Hot Springs, California 92340

July, 1969

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

EM007459

FINAL REPORT
Project No. 8-I-137
Grant No. OEG-9-9-140137-0007(057)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

COMPARISON OF TWO HISTORY INSTRUCTION METHODS: RADIO BROADCASTING AND VISUAL AIDS VERSUS INDIVIDUALIZED INSTRUCTION WITH AUDIO-VISUAL AIDS

Mt. San Jacinto College

Gilman Hot Springs, California

July, 1969

The research reported herein was performed pursuant to a grant with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

TABLE OF CONTENTS

Acknowledgements..... i

Abstract..... ii

Introduction..... 1

Methods of Research..... 4

Findings and Analysis..... 6

Table I..... 6

Table II..... 7

Table III..... 7

Table IV..... 8

Table V..... 9

Table VI..... 10

Conclusions and Recommendations..... 11

ACKNOWLEDGEMENTS

The author would like to acknowledge the contributions of the following people for this history research project: Dr. Milo P. Johnson, Superintendent-President, Mt. San Jacinto College, for his effort in developing this project and arranging for its financing through the U. S. Office of Education; William Cheeseman, history instructor, who worked on the development of the multimedia lessons to be used in the project; William Jones, history instructor, who contributed to the project by teaching one of the control groups; Mike Waterman, photographer, who helped photograph and manufacture filmstrips for the project; Mrs. Susan Tiberghien and Larry Williams, illustrators, who worked on the filmstrips; Dan Proctor and Art Kemp, sound technicians, who handled the tape recording and duplication; and last but not least, Harvey Grimshaw, who manages the production unit and dealt with the headaches of production.

Richard E. Banister
Dean of Academic Instruction

ABSTRACT

This study compared the mean scores of three tests given to two populations of junior college students taking American history since 1865 by two multimedia methods. The experimental group took history by FM radio and an illustrated syllabus and student response sheets. The control group took the same subject on campus using a combination of tapes, filmstrips, student response sheets and seminars. The radio students were able to conduct a discussion with their instructor by calling the radio station each night that the program was presented. A t-test was run to compare the mean scores of these two groups on two mid-term tests and one final test. A statistical analysis of the data determined that there was no significant difference at the 1% level of confidence in the learning of these two groups as displayed by their test scores.

Chapter I

INTRODUCTION

In the last decade great strides have been made in the development of programmed instruction, audio-visual techniques, and educational systems. The field of instructional design has begun to take on the characteristics of a contributing member of the educational professions family. With the introduction of relatively large amounts of federal money into curriculum development projects, many fields have expanded and improved their curricular offerings. This has been evident in the fields of physics, chemistry, mathematics, linguistics, geography, earth sciences, and social sciences.

Significant amounts of money have been used in these areas to pull together curricular development teams composed of learning theorists, subject matter specialists, and educators. Most of this development has taken place, however, in the elementary and secondary schools. Little initial development has occurred in higher education.

In recent years student demonstrations and student dissent in general has focused in some institutions on the problems of obsolesence in both curriculum and instructional methods in higher education. Many of the grievances of students in institutions of higher education have centered about their inability to have adequate contact with their instructors because these instructors were either at the head of a large lecture class or were absent from class and had turned it over to graduate assistants. Other grievances included the lack of humaneness in the large colleges and universities where students were treated as IBM numbers instead of individuals. Students have often grieved because of poor instructional methods in higher education and of the inability of some of the professors to convey their subject matter to the students.

Mt. San Jacinto recognized that these were the kinds of problems that community colleges interested in attracting students and holding students would have to overcome in order to succeed. In the winter of 1965, Mt. San Jacinto offered a mid-year workshop for its faculty that included several presentations on the writing of behavioral objectives and the utilization of multimedia techniques to teach toward those objectives. Several staff members showed an interest in this approach and more in-service training was provided for those interested faculty members to encourage them to develop behavioral objectives and multimedia systems as well as to show them how to do it. Several multimedia programs were initiated and implemented into the regular curricular offerings of the college during the 1967-68 school year.

Milo P. Johnson, Superintendent-President, recommended to the Board of Trustees of the college, that they pass a resolution encouraging instructors to use behavioral objectives and multimedia where feasible and encouraging the administration to recruit new faculty members who would be willing and able to teach in this manner. In the year that followed, several courses were presented by multimedia including American history to 1865, typing, shorthand, health education, and auto mechanics. During the summer of 1968, teachers were employed to work on multimedia systems for auto mechanics, freshman composition, public speech, health education, and college algebra. Beginning with the funding of this project, the course American history since 1865 was put into multimedia format.

A Rationale For Multimedia Instructional Systems

Contrary to many concepts of multimedia instructional systems, Mt. San Jacinto's multimedia program does not attempt to individualize instruction by feeding the student a steady diet of programmed material. Mt. San Jacinto has gone to the use of semi-automated tutorial systems as an integral part of numerous college courses in order to: (1) better utilize instructor time, (2) provide an opportunity for instructors to meet with seminar groups, and (3) to improve the quality of presentations of material to students.

In the traditional schedule at a typical college an instructor will meet his classes two, three, or four times a week in a lecture situation. Some courses provide laboratories to supplement lectures, but most classes do not have a lab. Under such a schedule the instructor meets his classes regularly in a large group where he stands at the front of the room and talks to the class. If the group is thirty or less there may be some opportunity for the class to ask questions; however, in most institutions of higher learning, enrollments in classes have reached a point where two-way communication is difficult if not impossible.

Mt. San Jacinto College has attempted to have the instructor's time utilized in a different manner by putting his lectures in a semi-programmed format and having them recorded on tape and filmstrips for future use. The idea is to invest considerable time in program development and hope that this program can be used for several years in several sections of the course. Students taking courses utilizing multimedia as an integral part of the course do not attend three or four lectures a week; instead, they will take one or two classes a week in the college library where they will receive the lectures in a semi-programmed format by a tape which is illustrated by a filmstrip.

When students meet with instructors under this system, they generally have two kinds of activities. One activity is a class held in a large lecture hall or auditorium where introductory lectures can be given, tests administered, or motion picture films viewed by the group. The other weekly activity is a discussion with fellow students and the instructor in small seminar groups. These groups vary from ten to twenty students, most of them having around fifteen in attendance.

In Mt. San Jacinto's multimedia program, teachers spent their time in program development (usually during the summer), small group discussions and large group presentations. Student time is spent in attending small group seminars, large group sessions, and individual study in the school library.

Most college teachers teaching a full load have little time for course development unless they develop the courses that they are to teach on their own time in the summer, in the evenings or during weekends. Mt. San Jacinto College has provided many of its teachers an opportunity to work during the summer months on the development of curriculum for their particular courses. Teachers have been able to design new courses from the ground up. Many of them have utilized behavioral objectives in establishing the parameters for their courses. They have also laid out the courses week by week, activity by activity to design the most effective teaching-learning system possible.

Equipment For Multimedia

Equipment requirements for multimedia will depend, of course, upon the type of media to be used in the program. It could include closed circuit television, open circuit television, motion picture, overhead projectors, teaching machines, programmed textbooks, library materials, art prints, study prints, or many other kinds of equipment including laboratory equipment. The administration and staff at Mt. San Jacinto made a thorough study of the kinds of equipment available for multimedia and the kinds of media that were within financial reach of the institution. It was decided that the filmstrip, tape recorder and student response sheet were the best and most practical media to use in this particular institution.

Study booths were designed and built to be housed in the library and in some classrooms. Tape recorders and projectors were purchased and placed in the study booths. A tape duplicating system was established by hooking fifteen slave tape recorders to one master tape recorder. This allowed quick duplication of fifteen copies of each lesson. A production unit was established employing artists, and photographers to manufacture filmstrips. Sound technicians were also employed to cut master tapes and duplicate copies. The college clerical pool produces the student response sheets as well as other printed forms required in the courses. Textbooks, library materials and other types of audio-visual and laboratory equipment normally found on college campuses are also utilized in the program.

Need For An Experimental Project

Although Mt. San Jacinto had successfully taught several college courses by multimedia, the college had not used the radio or television media in any of its classes It was decided that a community college had the responsibility for community education and that there was a role to play in the broadcasting of college courses over local community radio stations.

Arrangements were made with the local AM-FM radio station to utilize their FM broadcast facilities for an entire semester to present a new multimedia course. A grant from the U.S. Office of Education was applied for to finance the development of the course in American history since 1865 and the testing of this course on two populations, one being on the campus and the other in the community. It was felt that if students in the community could receive multimedia instruction at home by FM radio and printed illustrations and student response sheets that this would be an effective way for community colleges to educate members of the community that normally would not be able or willing to come to the college campus.

Considerable work has been done in utilizing open circuit television for educational programs. Radio has also been used for educational purposes for many years. The concept of using an illustrated guide and student response sheets along with the audio program is apparently a new concept that has not been discussed in the audio-visual literature.

Chapter II

METHODS OF RESEARCH

Before the experimental portion of the program could be carried out, the History instructor, William Cheeseman, was required to put together a multimedia system for History 17B, American history since 1865. Funds were secured from the U.S. Office of Education, Bureau of Research, for the development of such a program. Mr. Cheeseman wrote some of the program himself while the college production unit produced the accompanying filmstrips. Other portions of the program were secured from commercial publishers and adapted to this program.

The construction of the instructional program involved the identification of behavioral objectives, the writing of scripts teaching towards those objectives, the illustration of each script, the development of student response sheets, and the development of test instruments to measure achievement.

The group of students to use the program on campus took three lessons per week by multimedia consisting of a taped lesson accompanied by a filmstrip and a student response sheet. The response sheet was designed to be completed while the student took the lesson and turned in at the following seminar. The on-campus group met once weekly for a fifty minute seminar. This was the only time that they were able to meet as a group with the instructor.

The on-campus group took their multimedia lessons at their convenience in the school library in study booths which are equipped with tape recorders and filmstrip projectors. The school library is open from 8 a.m. to 10 p.m. Monday through Thursday and from 8 a.m. to 5 p.m. on Friday and from 1 p.m. to 5 p.m. on Saturday. No scheduled hours are required for multimedia in the library. Each student designed his own schedule for the week. The only requirement is that he must complete the multimedia before his weekly seminar meets.

The experimental group taking the program over FM radio received their multimedia lesson each week on Monday, Wednesday, and Friday evenings between the hours of 7 and 8 p.m. This hour was donated for the course by a local FM radio station as a public service. Approximately 30 minutes of the radio hour were devoted to listening to the multimedia presentation. Students in the radio audience listened to the audio portion of the program over the radio as they looked at the illustrations in their printed syllabus.

The latter half of the radio program was devoted to a group discussion session at which time the instructor would discuss the contents of the program while the students phoned in to the radio station to ask questions and make comments about the lesson. This schedule gave the radio audience approximately 90 minutes of programmed instruction during the week plus another 90 minutes of discussion. Both groups had textbook and other reading assignments to do outside of class.

The Populations

It was the original intent of the project to compare the two populations by pairing students from each population so as to have similar type students

in the study from each group. Comparisons were to be made by sex, marital status, and age. This information was available on the enrollment forms at the college and made it possible for the researchers to pair the students without their knowledge that they were being included in a study.

Despite an all out effort including paid advertising in newspapers, brochures in supermarkets, personal contacts and radio spot announcements, to publicize the radio program in the area where the FM radio station could be heard, the hoped for enrollment in the radio class did not come up to the expectations of the researchers. Initially 17 individuals enrolled for the radio course. By the night of the first class, 15 persons remained in the program. After the first two weeks five individuals dropped from the course, indicating their inability to listen to the radio regularly at the 7 to 8 o'clock hour three evenings a week. As the semester progressed, five more individuals dropped the course for miscellaneous reasons. Several of these people left the country to travel abroad, others found it difficult to listen at the hour that the program was on the radio because of small children in the family and others found that their work schedule changed making it impossible for them to participate. Five of the original 17 students enrolled for the course completed the course and took all three tests, two mid-terms and the final. The control group was chosen from several sections of American history since 1865 taught on campus. The control group was selected by pairing students from the on-campus classes with those remaining in the radio program.

Evaluation Instrument

The evaluation instruments used in this study were composed of the objective questions of three tests, two mid-term tests and one final test. Although the two mid-term tests included a section comprised of essay questions, this section was not included in the research because it did not appear in the final test and because it was felt that the subjective grading of the questions by more than one teacher would invalidate the test.

Statistical Treatment of Data

Three comparisons were made in the statistical treatment of the data. The t-test was the statistical design used in this research project. A null hypothesis was formulated that there was no difference between the experimental group and control group with reference to the mean score of each group's test. This null hypothesis was applied to three comparisons between these two groups. The first mid-term test, second mid-term test and the final test.

Chapter III

FINDINGS AND ANALYSIS

Tables I, II and III present the raw scores for the three tests for both the control and experimental group. Tables IV, V, and VI present the computations that were used to arrive at a t value.

Presentation of Findings

The statistical treatment of the data in this particular project led the researchers to the acceptance of the null hypothesis in all three cases. There was no significant difference between the mean scores of the control group and the experimental group in any of the three tests included in the research. The t scores were at the 1% level of competence.

TABLE I
FIRST MID-TERM RAW SCORES
FOR CONTROL AND EXPERIMENTAL
GROUPS

CONTROL	EXPERIMENTAL
83	78
66	75
60	75
57	71
57	45
$\Sigma X = 323$	$\Sigma X = 344$

TABLE II
SECOND MID-TERM RAW SCORES
FOR CONTROL AND EXPERIMENTAL
GROUPS

CONTROL	EXPERIMENTAL
66	76
58	70
54	68
51	62
40	51
$\Sigma X = 269$	$\Sigma X = 327$

TABLE III
FINAL TEST RAW SCORES
FOR CONTROL AND EXPERIMENTAL
GROUPS

CONTROL	EXPERIMENTAL
57	58
39	58
39	49
38	48
32	43
$\Sigma X = 205$	$\Sigma X = 256$

TABLE IV
T-TEST COMPUTATIONS FOR
FIRST MID-TERM TEST

CONTROL:

$M_1 = 64.6$

$s.d._1 = 9.77$

EXPERIMENTAL:

$M_2 = 68.8$

$s.d._2 = 12.106$

$$\sigma M = \frac{\sigma}{\sqrt{N - 1}}$$

$$\sigma M_1 = \frac{9.77}{\sqrt{5 - 1}}$$

$$\sigma M_1 = 4.885$$

$$\sigma M_2 = \frac{12.106}{\sqrt{5 - 1}}$$

$$\sigma M_2 = 6.053$$

$$\sigma \text{ diff} = \sqrt{\sigma^2 M_1 + \sigma^2 M_2}$$

$$= \sqrt{4.885^2 + 6.053^2}$$

$$= \sqrt{23.863 + 36.638}$$

$$= \sqrt{60.601}$$

$$\sigma \text{ diff} = 7.78$$

$$t = \frac{M_1 - M_2}{\sigma \text{ diff}}$$

$$= \frac{64.6 - 68.8}{7.78}$$

$$= \frac{-4.2}{7.78}$$

$$t = .54$$

TABLE V
T-TEST COMPUTATIONS FOR
SECOND MID-TERM TEST

CONTROL:

$M_1 = 53.8$

$s.d._1 = 8.49$

EXPERIMENTAL:

$M_2 = 65.4$

$s.d._2 = 8.47$

$$\sigma M = \frac{\sigma}{\sqrt{N - 1}}$$

$$\sigma M_1 = \frac{8.49}{\sqrt{5 - 1}}$$

$$\sigma M_1 = 4.245$$

$$\sigma M_2 = \frac{8.47}{\sqrt{5 - 1}}$$

$$\sigma M_2 = 4.235$$

$$\sigma \text{ diff} = \sqrt{\sigma^2 M_1 + \sigma^2 M_2}$$

$$= \sqrt{18.02 + 17.93}$$

$$= \sqrt{35.95}$$

$$\sigma \text{ diff} = 5.996$$

$$t = \frac{M_1 - M_2}{\sigma \text{ diff}}$$

$$= \frac{53.8 - 65.4}{5.996}$$

$$= \frac{-11.6}{5.996}$$

$$t = 1.93$$

TABLE VI
T-TEST COMPUTATIONS FOR
FINAL TEST

CONTROL:

$M_1 = 41$

$s.d._1 = 18.81$

EXPERIMENTAL:

$M_2 = 51.2$

$s.d._2 = 41.8$

$$\sigma M = \frac{\sigma}{\sqrt{N - 1}}$$

$$\sigma M_1 = \frac{18.81}{\sqrt{5 - 1}}$$

$$\sigma M_1 = 9.405$$

$$\sigma M_2 = \frac{41.8}{\sqrt{5 - 1}}$$

$$\sigma M_2 = 20.9$$

$$\sigma diff = \sqrt{\sigma^2 M_1 + \sigma^2 M_2}$$

$$= \sqrt{88.45 + 23.68}$$

$$= \sqrt{112.13}$$

$$\sigma diff = 10.59$$

$$t = \frac{M_1 - M_2}{\sigma diff}$$

$$= \frac{41 - 51.2}{10.59}$$

$$= \frac{-10.20}{10.59}$$

$$t = .963$$

Chapter IV

CONCLUSIONS AND RECOMMENDATIONS

This study, though limited by the small size of the population, demonstrates that a multimedia system utilizing radio broadcasts, printed illustrations and student response sheets is as effective as an on-campus multimedia program utilizing tapes, filmstrips and student response sheets. A statistical analysis using the t-test to compare the mean scores of two mid-term tests and a final test given to the two populations demonstrated that there was no significant difference between the mean scores for the two populations at the one percent level of confidence.

Recommendations

This research project demonstrates that the use of a multimedia system over radio is feasible to teach American History. It also points up the need for the further study in the use of radio as an instructional device. Studies should be made on larger populations in other subject areas to determine whether or not the effectiveness of a radio based multimedia system will work as well in other subject areas.

Another recommendation would be that any further research in this area should be carried out so that the radio audience can participate at a more convenient time than the time that was required for the course from Mt. San Jacinto to be presented. The 7 to 8 p.m. hour appears not to be a convenient time to present such a program. It may be that a daytime hour or perhaps several hours on one evening a week would be more convenient and successful.

A third recommendation would be to make a comparison between three populations, one being given the course by traditional classroom methods, another using a multimedia method on campus and the third using a radio based multimedia system.